Let $W_g$ be the set of $\mathbb{F}_q$-isogeny classes of abelian varieties of dimension $g$ defined over $\mathbb{F}_q$. By Honda-Tate theory, $W_g$ is identified with the set of $q$-Weil polynomials of degree $2g$. We show that certain congruence conditions on the coefficients of a $q$-Weil polynomial preclude the corresponding isogeny class from containing a hyperelliptic jacobian. In particular, as $q \to \infty$ this result implies that asymptotically at least 25% of $q$-isogeny classes of abelian threefolds over $\mathbb{F}_q$ do not contain the jacobian of a smooth hyperelliptic curve defined over $\mathbb{F}_q$. (Received September 12, 2019)